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Properties of Nonaqueous Electrolytes

Physical property measurements and structural studies were conducted in the aprotic solvents propylene carbonate, dimethylformamide, acetonitrile, and methyl formate. Among the solutes studied were lithium perchlorate, lithium chloride with and without AlCl_3 added, tetramethylammonium hexafluorophosphate, and lithium hexafluorophosphate, and lithium hexafluoroarsenate. Copper fluoride and copper chloride in solution were investigated, representing electroactive battery materials.

Structural studies were performed utilizing nuclear magnetic resonance and electron paramagnetic resonance techniques. Various physical properties were determined including solubility, heat of solution, vapor pressure, viscosity, density, sonic velocity, conductance, diffusion coefficient, and dielectric constant.

This study (see Note) was undertaken to further develop lithium batteries. In addition to uses for space exploration, this type of high energy density battery can result in improvements through weight reduction in battery-powered appliances and machinery.

Note:

The following documentation may be obtained from:

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Properties of Nonaqueous Electrolytes

Patent status:

No patent action is contemplated by NASA.

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